14. **(Original)** An electronic ballast for driving a gas discharge lamp, the ballast having improved input current THD comprising:

a rectifier for rectifying an AC input voltage from an AC power supply to produce a rectified bus voltage;

a valley-fill circuit having an energy storage device connected to filter said rectified bus voltage;

an inverter including series connected first and second switching elements having duty cycles D and 1-D, respectively, where $0 <= D <= 1$; and

means for varying said duty cycle D responsive to said bus voltage to cause said energy storage device to draw more current from said AC power supply around the peak of each half-cycle of said bus voltage and to cause said energy storage device to draw less current from said AC power supply around the trough of each half-cycle of said bus voltage.

15. **(Original)** The electronic ballast according to claim 14 wherein said valley-fill circuit comprises a buck converter.

16. **(Cancelled)**

17. **(Original)** An electronic ballast for driving a gas discharge lamp, the ballast including a rectifier for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage, a valley-fill circuit for receiving the rectified direct current bus voltage and maintaining the bus voltage above a predetermined minimum voltage, an inverter for receiving the bus voltage and producing a high-frequency alternating current voltage for driving the gas discharge lamp, and a control circuit for producing control signals to control the operation of the inverter, the ballast comprising:

a cat ear power supply for supplying power to the control circuit, said power supply adapted to draw power from the supply of sinusoidal alternating current power only during a predetermined portion of each half-cycle of the sinusoidal alternating current power.

18. **(Original)** The electronic ballast of claim 17 wherein the valley-fill circuit and inverter draw power from the supply of sinusoidal alternating current power during a

first predetermined portion of each said half-cycle and said cat ear power supply draws power from the supply of sinusoidal alternating current power only during a second, non-overlapping, predetermined portion of each said half-cycle.

19. **(Original)** The electronic ballast of claim 18 wherein said cat ear power supply includes a fixed voltage cut-in circuit for causing said cat ear power supply to draw power from a first time when the voltage of the supply of sinusoidal alternating current power is decreasing through a first predetermined voltage level, to a second time when the voltage of the supply of sinusoidal alternating current power is substantially zero.

20. **(Original)** The electronic ballast of claim 18 wherein said cat ear power supply includes a fixed voltage cut-out circuit for causing said cat ear power supply to draw power from a third time when the voltage of the supply of sinusoidal alternating current power is substantially zero, to a fourth time when the voltage of the supply of sinusoidal alternating current power is increasing through a second predetermined voltage level.

21. **(Original)** The electronic ballast of claim 18 wherein said cat ear power supply includes a back-end monitoring circuit for monitoring back-end current, herein defined as the current drawn by the valley-fill circuit and the inverter, the back-end monitoring circuit for causing said cat ear power supply to draw power from the supply of sinusoidal alternating current power only during a time when the back-end current is substantially zero.

22. **(Original)** The electronic ballast of claim 19 wherein said fixed voltage cut-in circuit includes voltage sensing means for sensing said first predetermined voltage, and enabling means responsive to said sensing means for enabling said cat ear power supply to draw power from said first time to said second time.

23. **(Original)** The electronic ballast of claim 20 wherein said fixed voltage cut-out circuit includes voltage sensing means for sensing said second predetermined voltage, and enabling means responsive to said sensing means for enabling said cat ear power supply to draw power from said third time to said fourth time.

24. **(Previously Amended)** The electronic ballast of claim 21 wherein said back-end monitoring circuit includes sensing means operatively connected to the valley-fill circuit and the inverter for sensing said back-end current, and disabling means responsive to said sensing means for preventing said cat ear power supply from drawing power when said back-end current exceeds a predetermined level.

25. **(Original)** An electronic ballast for driving a gas discharge lamp, the ballast comprising:

a rectifier for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage;

a valley-fill circuit for receiving the rectified direct current bus voltage and maintaining the bus voltage above a predetermined minimum voltage;

an inverter for receiving the bus voltage and producing a high-frequency alternating current voltage for driving the gas discharge lamp; and

a control circuit for producing control signals to control the operation of the inverter;

said valley-fill circuit including an energy storage element, an impedance, and a switch;

said energy storage element adapted to be connected between said bus voltage and a circuit common by means of said impedance when said switch is in a first predetermined conductive state so as to store energy.

26. **(Original)** The electronic ballast of claim 25 wherein said energy storage element comprises a capacitor.

27. **(Original)** The electronic ballast of claim 25 wherein said impedance comprises an inductor.

28. **(Original)** The electronic ballast of claim 25 wherein said impedance comprises a resistor.

29. **(Original)** The electronic ballast of claim 25 wherein said switch comprises a field-effect transistor.

30. **(Original)** The electronic ballast of claim 27 wherein said inductor comprises a tapped inductor including a tap, and said valley-fill circuit further includes a second switch connected between said tap and said bus voltage, whereby said inductor delivers stored energy to said energy storage device through said second switch when said first switch is in a second predetermined conductive state substantially opposite to said first predetermined conductive state.

31. **(Original)** The electronic ballast of claim 30 wherein said second switch is a commutation diode.

32. **(Original)** An electronic ballast for driving a gas discharge lamp, including:

a rectifier for receiving a supply of sinusoidal alternating current power and producing a rectified direct current bus voltage;

a valley-fill circuit for receiving the rectified direct current bus voltage and maintaining the bus voltage above a predetermined minimum voltage;

an inverter for receiving the bus voltage and producing a high-frequency alternating current voltage for driving the gas discharge lamp; and

a control circuit for producing control signals to control the operation of the inverter;

the improvement comprising:

a power supply operatively connected to draw power from said supply of sinusoidal alternating current power, said power supply further operatively connected to supply power to said control circuit, said power supply being the sole source of power for said control circuit.

33. **(Original)** The electronic ballast of claim 32 wherein said power supply comprises means for drawing power from said supply of sinusoidal alternating current power during a predetermined portion of each half-cycle of said sinusoidal alternating current power.

34. **(Previously Amended)** A method for causing an electronic ballast, including a control circuit, to draw more nearly sinusoidal input current from a source of sinusoidal alternating current power, said method comprising the steps of:

providing a power supply in said ballast for drawing current from said source of sinusoidal alternating current power during a predetermined portion of each half-cycle of said sinusoidal alternating current power;

causing said power supply to draw said current from said source of sinusoidal alternating current power during said predetermined portion of each half-cycle of said sinusoidal alternating current power; and

causing said power supply to supply power to said control circuit throughout each said half-cycle.

35. **(Previously Amended)** In an electronic ballast, including a valley-fill circuit having an energy storing device that stores energy in response to conduction of a first controllably conductive device, the valley-fill circuit coupled to a half-bridge inverter having second and third series-connected controllably conductive devices connected between a voltage bus and a circuit common, the ballast drawing its power from an AC power supply, a method for decreasing ballast input current total harmonic distortion and reducing lamp current crest factor comprising the steps of:

switching the second and third series-connected controllably conductive devices so that they have complementary duty cycles;

within each half-cycle of the voltage supplied by the AC power supply, varying the duty cycles of the second and third series-connected controllably conductive devices so that the duty cycles are substantially unequal during the middle portion of each said half-cycle, and substantially equal during the beginning and ending portions of each said half-cycle;

within each said half-cycle, varying the conduction of the first controllably device in a predetermined manner so that the energy storing device draws more current from the AC supply during the middle portion of each said half-cycle, and less current from the AC supply during the beginning and ending portions of each said half-cycle.

36. **(Previously Amended)** In an electronic ballast, including a valley-fill circuit having an energy storing device that stores energy in response to conduction of a first controllably conductive device, the ballast drawing its power from an AC power supply, a method for decreasing ballast input current total harmonic distortion comprising the steps of:

within each half-cycle of the AC power supply voltage, varying the conduction of the first controllably device in a predetermined manner so that the energy storing device draws more current from the AC supply during the middle portion of each said half-cycle, and less current from the AC supply during the beginning and ending portions of each said half-cycle.